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CLAIMS

We claim:

1. A water pump impeller for a cooling water pump unit including a housing defining a water chamber having a water inlet and a water outlet and having an impeller shaft in a seal/bearing unit mounted within the housing and configured to receive the water pump impeller connected to said impeller shaft within said water chamber, the improvement wherein said water pump impeller comprises a hub
5 configured and constructed to be secured to said drive shaft and located within said water chamber, said hub having an outer peripheral wall extending from an innermost end of the hub axially and radially to a substantially flat bottom wall;

a plurality of circumferentially spaced pump vanes secured in
10 circumferentially spaced relation to the outer peripheral wall of said hub and extending outwardly of said hub, each said pump vane extending radially outwardly from said bottom wall; and

a shroud secured to the upper and radially outer edges of said vane
extending outwardly beyond said hub with said adjacent vanes defining flow
15 passageways to the outer passageway of the housing, said shroud having a radially inner end portion overlying a radially outer portion of said hub to form an entrance portion of said flow passageway.

2. The water pump impeller of claim 1 wherein said hub and vanes and shroud are formed as a single molded unit.

3. The water pump impeller of claim 1 wherein the housing includes a bottom wall with the seal/bearing unit mounted in said bottom wall, and wherein said hub has a bottom wall located in spaced relation to the bottom wall of said housing, said vanes including an axial portion extending radially below said bottom wall of said hub
5 and with said axial portion extending radially inwardly beneath said hub bottom wall, and said housing bottom wall having a cavity surrounding said seal/bearing unit, and said vanes and said hub constructed and configured to establish a diversion of a portion of the water from the flow passageway into and through said cavity and back to said flow passageway to positively cool the bearing/seal unit.

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4. A water pump impeller for a cooling water pump unit having a cooling chamber defined by a housing and having a drive shaft rotatably mounted to said housing and projecting into said chamber, said housing having water inlet to said chamber and an outer passage from said chamber, said water pump impeller comprising a hub configured and constructed to be secured to said shaft within said chamber, said hub having an outer peripheral wall extending from an innermost portion of the hub axially and radially to a substantially flat bottom wall, a plurality of circumferentially spaced pump vanes secured in circumferentially spaced relation to the outer peripheral wall of said hub and extending outwardly of said hub, said pump vanes extending radially outwardly from said bottom wall and including a vane portion beneath the hub, and a shroud secured to the upper edges of said vane in spaced relation to said shaft and extending outwardly from said hub with said adjacent vane defining flow passageways to the outer passageway of the housing, said hub and vanes being constructed and configured to direct a portion of the water in said flow passageways into the space between said bottom wall of the hub and the housing to direct water into engagement with the seal/bearing unit.

5. The water pump impeller of claim 4 wherein said hub and shroud and vanes are formed as a single molded unit.

6. The water pump impeller of claim 5 wherein said impeller is formed of a plastic material.

7. The water pump impeller of claim 4 wherein said outer peripheral edge of said hub is a substantially convex wall and said bottom wall of the hub is a flat radial wall.

8. The water pump impeller of claim 4 wherein said housing includes a cavity with said seal/bearing unit located therein, and wherein said cooling water flow beneath said hub circulates through said cavity and about said seal/bearing unit.

9. The water pump impeller of claim 4 wherein said housing includes an encircling side wall for enclosing the outer radial portions of said impeller, said housing further constructed and configured with a circumferential water passageway terminating in an outlet immediately adjacent to the peripheral portion of said impeller for movement of water from the housing into said outer passageway of the housing.

10. The water pump impeller of claim 4 wherein the radially outer wall of said hub has a radially inner relatively constant diameter portion connected by a concave radial planar portion to a bottom edge portion, said bottom edge portion having a reverse convex curvature terminating in a flat bottom wall of said hub, said construction promoting the flow of a portion of the water in the flow passageway into said cavity.

11. The water pump impeller of claim 4 wherein each of said vanes is correspondingly constructed and includes a curved radially inner portion connected to the hub and extending radially outwardly and axially to an inclined portion extending radially outwardly and downwardly to the outer end of said vane, each of said vanes further including a integral lower portion extending downwardly beneath and inwardly of said hub with said lower portion further extending outwardly from the hub to the outlet passageway.

12. The water pump impeller of claim 11 wherein said hub, said vanes and said shroud are formed as a single integral molded member.

13. In combination, a cooling housing configured and constructed for interconnection to an internal combustion engine having a water inlet and a water outlet for connection to the engine cooling system, said water outlet being connected to a circumferential passageway adjacent an outer wall of said housing, said housing having a cover having an open end and a base,

said base being secured to the open end of said cover to close said chamber, the shaft rotatably mounted within said base and including an outer exposed drive shaft connection and an inner shaft portion, said base having an inner base wall with an encircling cavity about said shaft opening, a bearing and seal unit mounted within said shaft opening and projecting inwardly of said base within said cavity,

an impeller secured to the end of said shaft within said housing, said impeller having a hub secured to said shaft, said hub having a substantially concave circumferential surface, a plurality of circumferentially spaced and like vanes secured to said hub and having a radially inner portion connected to said concave circumferential surface and extending radially outwardly and circumferentially therefrom, each of said vanes projecting axially downwardly beneath said bottom wall of said hub and having an inner portion terminating in close spaced relation to said cavity, said vanes

terminating in spaced relation to said outlet passageway, a shroud connected to the top outer edges of said vanes and defining circumferentially spaced flow passageways from said chamber to said outlet passageway whereby rotation of said impeller draws water through said cover and discharges the same into said outlet passageway with a portion of the water flow being directed by said vanes and said hub about the outer edge of said hub and into and through said cavity and thereby cooling of said bearing and seal unit.

14. The combination of claim 13 wherein the radially outer edge of said hub is a substantially convex wall terminating in the bottom wall of said hub, said bottom wall being a substantially planar radial wall, the base having a flat upper wall opposing said hub bottom wall, said cavity being formed in said base upper wall and including a radial portion immediately adjacent said seal/bearing unit and an inclined outwardly extended outer wall extending from said radial portion to said flat bottom wall of said base, said vanes projecting below said bottom wall of the hub and extending radially inwardly to a distance substantially corresponding to the location of said inclined wall.

15. The combination of claim 13 wherein said impeller is formed as a single molded member including the hub, vanes and shroud.

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